

Lower Platte River Basin Water Management Plan P-MRNRD Annual Report 2021

DRAFT – March 1, 2022

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**Confluence of the Platte and Elkhorn Rivers –
March 16, 2019**

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1.0 INTRODUCTION

The Pappio-Missouri River Board of Directors adopted the Lower Platte River Basin Water Management Plan (LPBWMP), dated October of 2017, on December 14, 2017. As part of the Lower Platte River Basin Coalition, the six other NRDs and the Nebraska Department of Natural Resources also approved the LPBWMP and agreed to cooperatively implement the plan per Interlocal Agreement #2.

The Lower Platte River Basin Water Management Plan recommends numerical limits for allowable new water depletions during the first 5-year increment of the plan (January 1, 2017 through December 31, 2021). The allowable new depletions for the first 5-year increment were divided by subbasin and further by individual NRD as documented in Table 4.2 of the LPBWMP.

The LPBWMP calls for the annual tracking of allowable new depletions beginning July 1, 2016. The first reporting period of the Basinwide Plan first increment, according to Table 5.1, is July 1, 2016 through December 31, 2017. All subsequent reporting years are required on a calendar year basis starting in 2018. This report provides the data collected during the 2021 reporting period for the plan area within the Pappio-Missouri River NRD in accordance with Table 5.2 of the LPBWMP.

2.0 2021 DATA COLLECTION

Data collected and reported on water supplies and uses within the P-MRNRD include:

- Certified Irrigated Acres
- Co-mingled Groundwater and Surface Water Uses
- Municipal and Industrial Groundwater Uses
- New Groundwater consumptive uses
- Groundwater Use Transfers
- Water supply well permits granted
- Retirement of groundwater consumptive uses
- Water use flow meter date
- Water banking activities
- Stream flow accretion activities
- Groundwater elevation data
- Stream gage measurements on NRD maintained gages
- NRD regulations/management area activities
- New water depletions
- New data collected or model/study results

2.1 CERTIFIED IRRIGATED ACRES

The P-MRNRD has not completed certification of irrigated acres within its Integrated Management Plan (IMP) or LPBWMP area, which includes all areas tributary to the Platte and Elkhorn Rivers (herein after referred to as the “plan area”). This plan area covers approximately 228,000 acres in Sarpy, Douglas and Washington counties. Since 2009, approximately 3,996 new irrigated acres which received a variance from the District under the requirements of LB 483 have been certified.

Initial reporting by landowners to certify irrigated acres within the P-MRNRD IMP area yielded an approximate 75% response rate. As of this report, the P-MRNRD has certified 25,600 irrigated acres (only 2,180 by surface water). The P-MRNRD is proposing to complete the certification of irrigated acres in 2022.

2.2 CO-MINGLED GROUNDWATER AND SURFACE WATER USE

No data is collected on co-mingled groundwater and surface water use within the P-MRNRD.

2.3 MUNICIPAL AND INDUSTRIAL GROUNDWATER USES

The P-MRNRD has collected annual data on municipal uses within the plan area since 2016. This data is reported only for the municipal wells within our District and would not include Metropolitan Utilities District (MUD), Lincoln, or Fremont wells in adjacent NRDs or counties. Data from commercial or industrial users who have their own individual water supply well is not collected at this time.

Municipal Annual Water Use

Municipal Well Field	2016 Total Pumped (Ac-ft)	2017 Total Pumped (Ac-ft)	2018 Total Pumped (Ac-ft)	2019 Total Pumped (Ac-ft)	2020 Total Pumped (Ac-ft)	2021 Total Pumped (Ac-ft)
Papillion	4,326.2	4,661.1	4,482.2	4,655.4	5,807.8	5,656.3
Lincoln*	20,451.2	22,115.1	11,866.5	8,246.5	9,007.9	18,561.5
MUD South	38,030.4	27,217.2	31,104.3	36,201.0	35,701.3	30,554.0
MUD West*	8,976.2	12,225.1	10,741.7	9,861.9	12,706.1	14,042.8
Fremont*	4,971.5	4,987.4	5,395.3	5,719.6	7,262.3	7,960.5
Valley	334.4	469.3	506.3	537.3	740.4	713.9
Springfield	170.8	183.8	202.3	188.7	232.0	243.0
Gretna	1,052.0	1,267.4	1,263.5	1,279.7	1,648.0	1,635.7
Arlington	217.4	231.3	165.8	195.3	269.7	301.2
TOTAL	83,501.6	73,357.7	65,727.9	66,884.4	67,531.7	79,668.9

*Only includes wells in the P-MRNRD

Lincoln and MUD's municipal uses have varied over the last few years not only due to demand, but to ongoing treatment plant maintenance and flooding issues. The net consumptive use of municipal water is not tracked or estimated at this time as return flows to the Platte River tributaries are not reported or estimated. Municipal water pumped by MUD and Papillion would be considered a total consumptive use as it ends up as return flow to the Missouri River.

2.4 NEW GROUNDWATER CONSUMPTIVE USES

The P-MRNRD only tracks groundwater consumptive uses as a result of new irrigated acres which receive a variance from the District under the prior requirements of LB 483 and our current IMP. Only 26 new groundwater irrigated acres in the plan area were granted a variance in 2021. Any depletions from new irrigated acres are reported in Section 2.14.

New groundwater consumptive uses from high capacity wells used for livestock were permitted in the uplands north of Arlington by the PMRNRD in 2018, but are not accounted for as a consumptive use at this time.

2.5 GROUNDWATER USE TRANSFERS

The P-MRNRD does not review or approve groundwater use transfers at this time. Therefore, no data is available.

2.6 WATER SUPPLY WELL PERMITS GRANTED

The P-MRNRD adopted requirements for well permits for new high capacity wells effective March 1, 2018. Six new high capacity well permits were approved in the Platte River Basin (Plan Area) in 2021. Only one new well expanded or created new irrigated acres. Two wells were constructed to irrigate a new golf course that is currently outside the hydrologically-connected area (HCA) in the P-MRNRD. The other three were approved for other uses including open heat pumps and supplemental water for hunting. The one that developed new irrigated areas is documented as new peak season depletions in Section 2.14. A copy of the data provided in the Excel spreadsheet is attached to this report for reference.

2.7 RETIREMENT OF GROUNDWATER CONSUMPTIVE USES

The P-MRNRD does not review or collect information on groundwater use retirements at this time. According to the NDNR Registered Well Database, one high capacity (irrigation) well was decommissioned in 2021 in the P-MRNRD IMP Area. This property had not been irrigated within the past 10 years, was not in the HCA, and was purchased as public property by Omaha Public Power District (OPPD) and will not be irrigated in the future. The retirement of groundwater consumptive uses is considered negligible during this reporting period.

2.8 WATER USE FLOW METER DATA

The P-MRNRD does not require or collect data from flow meters at this time. Therefore, no data is currently available. Flow meters will be required on all active high capacity wells following March 1, 2023. Prior to that time, the NRD will collect flow meter data from wells that it provides cost-share funding to install the flow meter.

2.9 WATER BANKING ACTIVITIES

The P-MRNRD does not operate or maintain any available water banks at this time. Therefore, no data is available.

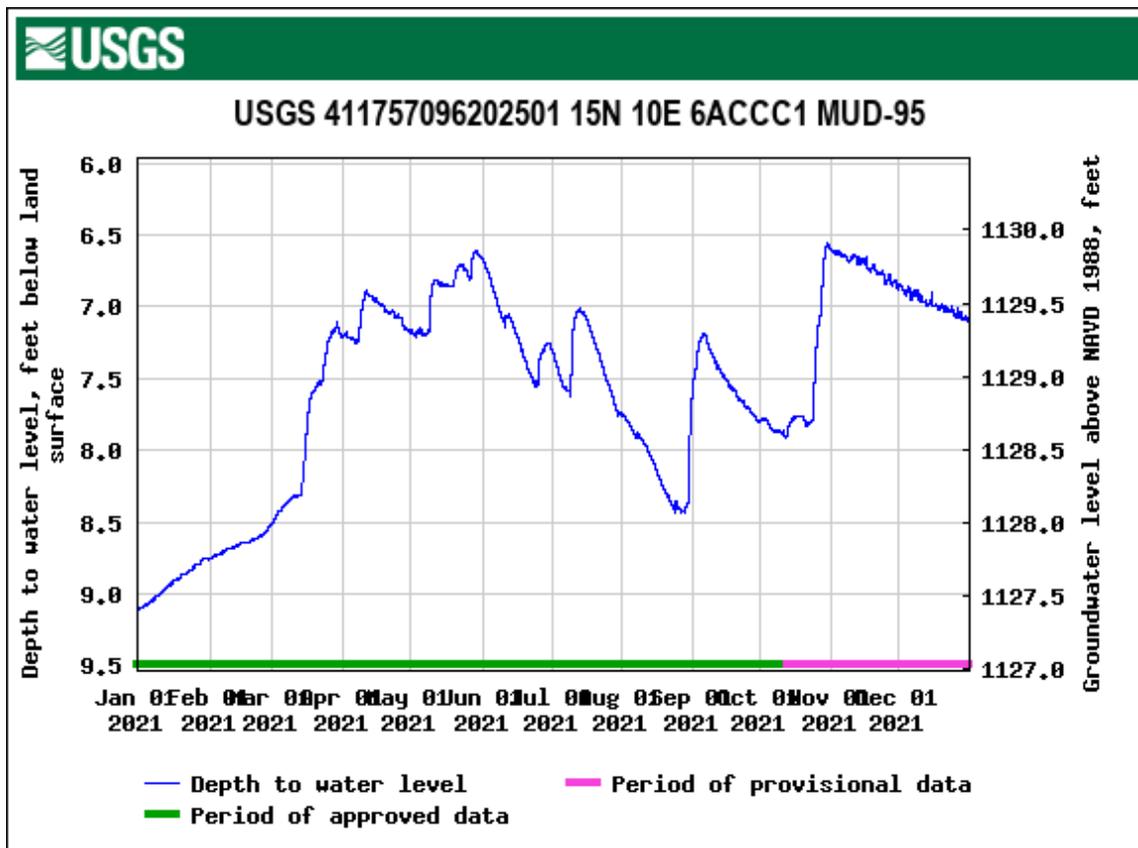
2.10 STREAMFLOW ACCRETION ACTIVITIES

There are no ongoing projects in the P-MRNRD to augment surface water flow or conjunctively manage groundwater and surface water. Ongoing studies relevant to conjunctive management of surface and groundwater between the Platte and Elkhorn Rivers are discussed in Section 2.15.

2.11 GROUNDWATER ELEVATION DATA

Groundwater level measurements were collected at 29 locations within the plan area during the spring of 2021. Some sites have been measured since 1978. In general, groundwater levels in late April through May 2021 were 2 feet below to 2 feet above their period of record average. Figure 1 displays the depth above or below the running average and the percent rise or decline from the running average for each groundwater level measurement location. This groundwater level data in the IMP area has a standard deviation between 1 and 2 feet.

The USGS and PMRNRD have been able to collect continuous recording groundwater level data at 5 sites within the plan area, spread across the Platte and Elkhorn River valley between Leshara and Waterloo. Below is the annual data from one of these sites located between the two rivers.



2.12 STREAM GAGE MEASUREMENT ON NRD MAINTAINED GAGES

The P-MRNRD does not own or operate any stream gages within our IMP area that are independent of data collected by USGS or NDNR.

2.13 NRD REGULATIONS/MANAGEMENT AREA ACTIVITIES

Major updates to the P-MRNRD's Groundwater Management Plan (GMP) and Rules and Regulations were adopted in March 2018. A Phase I Groundwater Quantity Management Area (GMAs) was designated for the entire P-MRNRD on March 1, 2018. New rules which became effective March 1, 2018 under the new Phase I GMA designation include:

- Water Supply Well Permits are required for all new high capacity wells (>50 gpm) within the NRD.
- In addition to minimum state requirements, a 600 foot well spacing will be required between any new high capacity well and any other registered water supply well.
- Flow meters will be required within the hydrologically connected area of the IMP by March 1, 2023.

2.14 NEW WATER DEPLETIONS

The P-MRNRD requires the issuance of a variance to expand irrigated acres in the hydrologically connected area of our IMP. This data is input into the accounting for estimating depletions as described on page 28 of the LPBWMP.

The P-MRNRD received and approved one variance applications to expand irrigated acres in the plan area during the reporting period and their peak season depletions are reported in Table 1. The registration of any new wells during this time period was used as check to verify that any new uses actually received a variance. It was confirmed that no other new wells were completed during 2021 that cause a new water depletion.

Table 1. Peak Season Depletions for High Capacity Wells in the Plan Area (2021)

Well Permit No.	Acres	NIR (in)	SDF	Peak Season Depletion	Well Status	Location
1021010	26	0.55	0.929	3.98	G-191975	41.323056°, -96.394167°

It is the P-MRNRD's understanding that increases of municipal use for municipalities with transfer permits, including MUD and Lincoln, were already accounted for before allowed depletions were

calculated. Increases in use by other municipalities or industry will be researched by the Basin Coalition and accounted for after the first increment.

Not including the livestock uses, the balance of allowable new depletion for the P-MRNRD between as of December 31, 2021 is shown in the table below:

Depletion Desc.	Peak Season Depletion (AF)	Balance (AF)
2016 – 2021 PMRNRD Allowabe Depletion		869
2016-17 New NRD GW Depletion	1.5	867.5
2016-17 New NDNR SW Depletion	67.3	800.2
2018 New NRD GW Depletion	0.0	800.2
2018 New NDNR SW Depletion	0.0	800.2
2019 New NRD GW Depletion	0.0	800.2
2019 New NDNR SW Depletion	10.0	790.2
2020 New NRD GW Depletion	28.5	761.8
2020 New NDNR SW Depletion	-10.3	772.1
2021 New NRD GW Depletion	4.0	768.1
2021 New NDNR SW Depletion	?	?
TOTAL Depletion	101.0	772.1

2.15 NEW DATA COLLECTED OR MODEL/STUDY RESULTS

The P-MRNRD is engaged in several ongoing studies with other NRDs and agencies within the Lower Platte Basin.

One such study effort is the Lower Platte River Consortium spearheaded by the Lower Platte South NRD in partnership with Lower Platte North NRD, P-MRNRD, City of Lincoln, MUD, and NDNR. The objective of the consortium is to develop a Drought Contingency Plan for the Lower Platte River. See documentation available at: <https://www.lpsnrd.org/draft-drought-plan>.

Another effort is an ongoing USGS study sponsored by the P-MRNRD and Lower Platte North NRD to monitor groundwater and surface water conditions in the combined Platte and Elkhorn River Valley. A final report was issued in 2019 and is available through the USGS publication warehouse at: <https://pubs.er.usgs.gov/publication/sir20195048>.

As of 2020, Airborne Electromagnetic (AEM) survey data has been collected for the entire P-MRNRD IMP area. All AEM reports and data are available at www.enwra.org and are being electronically stored on the [Nebraska GeoCloud](#).

3.0 REVISIONS TO THE PLAN

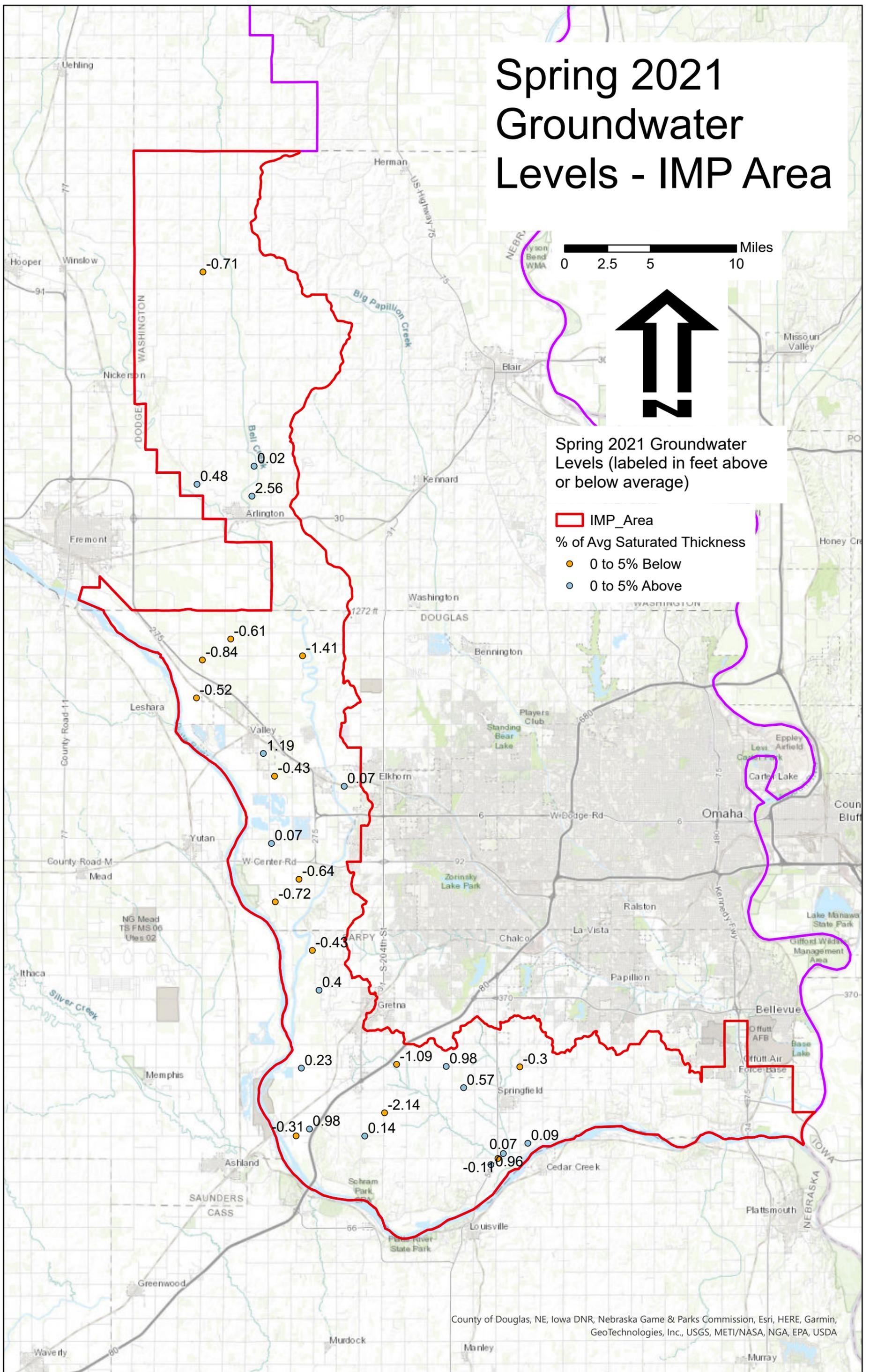
There are no anticipated revisions to the plan at this time. The P-MRNRD will need to document and prepare revisions to its Integrated Management Plan with NDNR in order to incorporate the allowable depletion values per the LPBWMP.

4.0 COALITION BUDGET AND MEMBER CONTRIBUTIONS

The P-MRNRD has \$20,000 budgeted for support of the coalition this fiscal year (before July 1, 2022)

FIGURES and APPENDICES

Spring 2021 Groundwater Levels - IMP Area



County of Douglas, NE, Iowa DNR, Nebraska Game & Parks Commission, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, METI/NASA, NGA, EPA, USDA

Figure 1

NRD (abbreviation)	NRD Permit ID	DNR Well Registration	DNR Well ID	County	X UTM Zone 14	Y UTM Zone 14	Latitude	Longitude	Township	Range	Range Direction	Section	SubSection	HUC8	HUC12	Use	Approval Date	Install Date	Status	Flow Meter ID	Flow Meter Install Date	Pump Capacity (gpm)	Replacement Well	Notes
PMR	2016_1	G-180920	245475	Sarpy			41.10488889	-96.30227778	13	10	E	9	SESW	10200202	102002020202	C	9/14/2016	9/14/2016	A			1800	No	Lyman-Richey Commercial/Industrial
PMR	2016_2	G-189021	245476	Sarpy			41.10579444	-96.30468056	13	10	E	9	SESW	10200202	102002020202	C	9/16/2016	9/16/2016	A			1800	No	Lyman-Richey Commercial/Industrial
PMR	2016_3	G-181167	245902	Sarpy			41.02886111	-96.27327778	12	10	E	11	NWNW	10200202	102002020203	C	10/19/2016	10/19/2016	A			322	No	Cloisters on the Platte Commercial/Industrial
PMR	2016_4	G-182491	248288	Sarpy			41.10592222	-96.15974444	13	11	E	10	SESE	10200202	102002020206	C	10/28/2016	10/28/2016	A			100	No	Hughes Tree Service Commercial/Industrial
PMR	2017_1	G-184028	250836	Douglas			41.220675	-96.332275	15	10	E	31	SESE	10220003	102200031006	I	3/7/2017	3/7/2017	A			260	No	Variance V-0052
PMR	2017_2	G-182516	248316	Dodge			41.40638889	-96.48722222	17	8	E	35	NENE	10200202	102002020103	C	4/17/2017	4/17/2017	A			700	No	NEBCO Commercial/Industrial
PMR	2017_3	G-184854	252279	Douglas			41.24883889	-96.29699167	15	10	E	21	SWSE	10220003	102200031006	C	10/2/2017	10/2/2017	A			120	No	West Shores Commercial/Industrial
PMR	2018_1	G-184660	251914	Sarpy			41.17166667	-96.30138889	14	10	E	21	SWNE	10220003	102200031006	O	3/1/2018	3/1/2018	A			125	No	Registered Use is Other
PMR	1018009	G-075361	252697	Douglas	723402.01670	4566214.90627	41.2165	-96.33506	14	10	E	6	NWNE	10200202	102002020105	P	6/12/2018	3/15/2018	A			3100	Yes	MUD West Well Field Replacement Well
PMR	1018011	G-186281	254511	Sarpy	725780.35866	4548494.57894	41.05611111	-96.31305556	13	10	E	32	SENE	10200202	102002020202	O	8/30/2018	10/19/2018	A			375	No	Use is Recreation to fill duck hunting pond
PMR	1019009	G-073758	258669	Douglas			41.31942222	-96.29190556	16	10	E	34	NWNW	10220003	102200031006	I	9/24/2019	10/5/2019	A			500	Yes	Replaced G-073758
PMR	1019003	G-190153	262576	Douglas			41.3811	-96.3841	16	9	E	2	SW	10220003	102200031006	C	2/4/2019	7/13/2020	A			75	No	Quasar Drive-In Commercial/Industrial
PMR	1018005	G-191421	264536	Washington			41.6064	-96.3862	19	9	E	23	SW	10220003	102200030905	S	4/26/2018		I			80	No	Ruwe Livestock Barns
PMR	1018008	G-191397	264497	Washington			41.5048	-96.4108	18	9	E	28	SWNE	10220003	102200030906	S	6/11/2018	6/11/2018	A			80	No	Soil Livestock Barns
PMR	1020002	G-054569	262257	Douglas			41.27297	-96.25911	15	10	E	14	NW	10220003	102200031006	I	4/15/2020	4/30/2020	A			1000	Yes	Replaced G-054569
PMR	1020003	G-038435	262253	Douglas			41.346283	-96.33553	16	10	E	19	NW	10220003	102200031006	I	6/3/2020	5/5/2020	A			550	Yes	Replaced G-038435
PMR	1020006			Sarpy			41.10366	-96.28874	13	10	E	10	SW	10200202	102002020202	I	7/31/2020		I			700	No	Variance V-0057
PMR	1020008	G-190863	263602	Douglas			41.1943	-96.3155	14	10	E	8	SW	10220003	102200031006	I	9/8/2020	9/9/2020	A				No	Added well, but area was already irrigated
PMR	1020009	G-191972	265587	Douglas			41.3388	-96.2898	16	10	E	22	SW	10220003	102200031005	I	11/12/2020	12/1/2020	I			200	No	Added well to prevent suging, but area was already irrigated
PMR	1020010	G-062103	263949	Douglas			41.28173	-96.2676	15	10	E	11	SW	10220003	102200031006	I	12/1/2020	12/7/2020	A			1000	Yes	Well moved due to RR track expansion
PMR	1020011	G-191974	265361	Douglas			41.27583	-96.31389	15	10	E	17	NENE	10220003	102200031006	I	12/7/2020	2/2/2021	A			600	No	V-0055
PMR	1020012	G-191975	265363	Douglas			41.27	-96.30611	15	10	E	16	SW	10220003	102200031006	I	12/7/2020	2/1/2021	A			900	No	V-0054
PMR	1021001	G-192383	266109	Douglas			41.353119	-96.409931	16	9	E	16	SESE	10200202	102002020104	O	1/22/2021	7/12/2021	I				No	Use is Recreation to fill duck hunting pond
PMR	1021006	G-191830	265301	Sarpy			41.172881	-96.274359	14	10	E	22	NENE	10220003	102200031006	I	4/21/2021	4/27/2021	I			750	No	Lost Rail Golf Course irrigation
PMR	1021007	G-191831	265302	Sarpy			41.173001	-96.277199	14	10	E	22	NENE	10220003	102200031006	I	4/21/2021	4/29/2021	I			750	No	Lost Rail Golf Course irrigation
PMR	1021010	G-193079	267274	Douglas			41.323056	-96.394167	16	9	E	27	SWSE	10200202	102002020104	I	6/25/2021	8/4/2021	I			600	No	V-0058

NRD (abbreviation)	NRD Transaction ID	Part	Change Type	County	X UTM Zone		Latitude	Longitude	Township	Range	Range Direction	Section	SubSection	HUC8	HUC12	Change Date	Area (acres)	DNR Well Registrations	DNR Surface Water Appropriation ID	Ratio Surface Water	Irrigation Method	Use of Irrigated Acres	SDF	NIR feet	Notes
					14	Y UTM Zone 14																			
PMR	V-0052	1	New	Douglas			41.220675	-96.332275	15	10	E	31	SESE	10220003	102200031006	2/16/2017	11.00	G-184028		Center Pivot		0.85	0.54		
PMR	V-0054	1	New	Douglas			41.27	-96.30611	15	10	E	16	SW	10220003	102200031006	12/7/2020	110.00	G-191975		Center Pivot		0.83	0.55		
PMR	V-0055	1	New	Douglas			41.27583	-96.31389	15	10	E	17	NENE	10220003	102200031006	12/7/2020	35.00	G-191974		Center Pivot		0.78	0.55		
PMR	V-0057	1	New	Sarpy			41.10366	-96.28872	13	10	E	10	SW	10200202	102002020202	12/31/2020	60.00	NA		Center Pivot		0.89	0.55		
PMR	V-0058	1	New	Douglas			41.322956	-96.3943169	16	9	E	27	SWSE	10200202	102002020104	6/25/2021	26.00	G-193079		Center Pivot		0.93	0.55		